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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/580,292

02/27/2007

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EXAMINER

PINKNEY, DAWAYNE

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/580,292	<b>Applicant(s)</b> HISATAKE ET AL.	
	<b>Examiner</b> DAWAYNE A. PINKNEY	<b>Art Unit</b> 2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 24 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-11 and 14-20 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 12 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/30/2006</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement (IDS) submitted on 06/30/2006 has been considered by the examiner.

### *Priority*

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Claim Objections*

3. Claim 11 is objected to because of the following informalities: the claim ends with a comma “,” and should end with a period --.---. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 6-11, 14-17, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et al. (US 5,841,489).

Regarding **claim 1**, Yoshida discloses, a method for generating a broadband light sideband, comprising the steps of:

inputting a light beam from a predetermined light source to an electro-optic phase modulator (Col. 7, lines 39-50, and Col. 9, lines 3-31);

Art Unit: 2873

generating a light sideband sequence by subjecting a phase modulation to said light beam in said electro-optic phase modulator (Col. 7, lines 39-50, and Col. 9, lines 3-31); and

making an intensity distribution of said light sideband sequence uniform by setting a predetermined spatial distribution of a phase modulation index in consideration with the spatial distribution of said light beam in said electro-optic phase modulator (Col. 7, lines 39-50, and Col. 9, lines 3-31).

Regarding **claim 2**, Yoshida discloses, the method for generating a broadband light sideband according to claim 1, wherein the spatial distribution of said phase modulation index is formed by controlling a configuration of an electrode in said electro-optic phase modulator (Col. 7, lines 39-50, and Col. 9, lines 3-31).

Regarding **claim 3**, Yoshida discloses, the method for generating a broadband light sideband according to claim 1, wherein the spatial distribution of said phase modulation index is formed by operating a polarization reversal technique in said electro-optic phase modulator (Col. 7, lines 39-50, and Col. 9, lines 3-31).

Regarding **claim 6**, Yoshida discloses, the method for generating a broadband light sideband according to claim 1, further comprising a step of performing a spatial Fourier transformation on an output light beam including said light sideband sequence after emitted from said electro-optic phase modulator (Col. 4, lines 25-44).

Regarding **claim 7**, Yoshida discloses, the method for generating a broadband light sideband according to claim 6, wherein said spatial Fourier transformation is performed by using a convex lens (Col. 4, lines 25-44).

Art Unit: 2873

Regarding **claim 8**, Yoshida discloses, the method for generating a broadband light sideband according to claim 6, wherein said spatial Fourier transformation is performed by using a concave mirror (Col. 4, lines 25-44).

Regarding **claim 9**, Yoshida discloses, an apparatus for generating a broadband light sideband comprising:

a predetermined light source (Col. 7, lines 39-50, and Col. 9, lines 3-31); and

an electro-optic phase modulator for generating a light sideband sequence by subjecting a phase modulation to a light beam emitted from said light source and making an intensity distribution of said light sideband uniform by setting a predetermined spatial distribution of the phase modulation index in consideration with the spatial distribution of said light beam (Col. 7, lines 39-50, and Col. 9, lines 3-31).

Regarding **claim 10**, Yoshida discloses, the apparatus for generating a broadband light sideband according to claim 9, wherein said electro-optic phase modulator comprises an electrode controlled into a predetermined configuration for generating said spatial distribution of the phase modulation index. (Col. 7, lines 39-50).

Regarding **claim 11**, Yoshida discloses, the apparatus for generating a broadband light sideband according to claim 10, wherein a polarization reversal technique is applied to said electro-optic phase modulator for generating said spatial distribution of the phase modulation index (Col. 7, lines 39-50 and Col. 9, lines 3-31).

Regarding **claim 14**, Yoshida discloses, the apparatus for generating a broadband light sideband according to claim 9, further comprising a means for performing a spatial Fourier

Art Unit: 2873

transformation on the output light beam including said light sideband after emitted from said electro-optic phase modulator (Col. 4, lines 25-44).

Regarding **claim 15**, Yoshida discloses, the apparatus for generating a broadband light sideband according to claim 14, wherein said means for operating a spatial Fourier transformation comprises a convex lens (Col. 4, lines 25-44).

Regarding **claim 16**, Yoshida discloses, the apparatus for generating a broadband light sideband according to claim 14, wherein said means for operating a spatial Fourier transformation comprises a concave mirror (Col. 4, lines 25-44).

Regarding **claim 17**, Yoshida discloses, the apparatus for generating a broadband light sideband according to claim 9, further comprising a light beam output means for outputting an output light beam including said light sideband sequence (Col. 7, lines 39-50 and Col. 9, lines 3-31).

Regarding **claim 20**, Yoshida discloses, the apparatus for generating a broadband light sideband according to claim 15, further comprising a light beam output means for outputting an output light beam including said light sideband sequence, wherein said light beam output means comprises an optical fiber (inherent based on the dashed line connecting 4 and 5 of Fig. 18(a)).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2873

7. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US 5,841,489) as applied to claims 15 and 17 above, in view of Khayim et al. (A Novel Ultrahigh-Speed Electrooptic Lens with Periodic Domain Inversion; already of record).

Yoshida remains as applied to **claims 15 and 17 above**.

Yoshida does not disclose the light beam output means comprises a diffraction grating, and a light beam output means for outputting an output light beam including said light sideband sequence, wherein said light beam output means comprises a diffraction plate provided with a slit placed at a focal point of said convex lens and an additional convex lens.

Khayim teaches, from the same field of endeavor that in an apparatus for generating a broadband light sideband it would be desirable to make the light beam output means comprises a diffraction grating (Pages 115-118), and a light beam output means for outputting an output light beam including said light sideband sequence, wherein said light beam output means comprises a diffraction plate provided with a slit placed at a focal point of said convex lens and an additional convex lens (Pages 115-118) for the purpose of providing an efficient electrooptic device (Page 115, Abstract, lines 2-3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the light beam output means comprises a diffraction grating, and a light beam output means for outputting an output light beam including said light sideband sequence, wherein said light beam output means comprises a diffraction plate provided with a slit placed at a focal point of said convex lens and an additional convex lens as taught by the apparatus for generating a broadband light sideband of Khayim in the apparatus for generating a broadband light sideband of Yoshida since Khayim teaches it is known to include these features

Art Unit: 2873

in an apparatus for generating a broadband light sideband for providing an efficient electrooptic device (Page 115, Abstract, lines 2-3).

*Allowable Subject Matter*

8. Claims 4-5 and 12-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: none of the prior art either alone or in combination disclose or teach of the claimed combination of limitations to warrant a rejection under 35 USC 102 or 103. Specifically, in reference to dependent claim 4, none of the prior art either alone or in combination disclose or teach of the claimed method for generating a broadband light sideband specifically including, as the distinguishing feature(s) in combination with the other limitations the claimed “polarization reversal technique is performed by reversing a crystal axis of an electro-optic crystal in said electro-optic phase modulator with a period  $L$  defined in the formula  $L = [2 \text{ fm}(1/V_{\text{gopt}} - 1/V_{\text{pmod}})]^{\text{sup.}-1}$  (fm: a frequency of the modulation wave,  $V_{\text{gopt}}$ : a group velocity of said light beam,  $V_{\text{pmod}}$ : a phase velocity of the modulation wave).”

10. Specifically, in reference to dependent claim 5, none of the prior art either alone or in combination disclose or teach of the claimed method for generating a broadband light sideband specifically including, as the distinguishing feature(s) in combination with the other limitations the claimed “the spatial distribution  $g(x)$  of said phase modulation index is represented by the formula  $g(x) = 8 \text{ nm}L / \lambda \sin(\pi W(x)/(2L))$ , (nm: a change in the refraction index of the

Art Unit: 2873

electro-optic crystal caused by the phase modulation,  $\lambda$ : a wavelength of the light beam,  $L$ : a period of the polarization reversal,  $W(x)$ : a polarization reversal width).

11. Specifically, in reference to dependent claim 12, none of the prior art either alone or in combination disclose or teach of the claimed apparatus for generating a broadband light sideband specifically including, as the distinguishing feature(s) in combination with the other limitations the claimed “polarization reversal technique is performed by reversing a crystal axis of an electro-optic crystal in said electro-optic phase modulator with a period  $L$  defined in the formula  $L = [2 f_m(1/V_{gopt} - 1/V_{pmod})]^{-1}$  ( $f_m$ : a frequency of the modulation wave,  $V_{gopt}$ : a group velocity of said light beam,  $V_{pmod}$ : a phase velocity of the modulation wave).”

12. Specifically, in reference to dependent claim 13, none of the prior art either alone or in combination disclose or teach of the claimed apparatus for generating a broadband light sideband specifically including, as the distinguishing feature(s) in combination with the other limitations the claimed “the spatial distribution  $g(x)$  of said phase modulation index is represented by the formula  $g(x) = 8 \text{ nm} L / \lambda \sin(\pi W(x) / (2 L))$ , ( $\text{nm}$ : a change in the refraction index of the electro-optic crystal caused by the phase modulation,  $\lambda$ : a wavelength of the light beam,  $L$ : a period of the polarization reversal,  $W(x)$ : a polarization reversal width).”

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAWAYNE A. PINKNEY whose telephone number is (571)270-1305. The examiner can normally be reached on Monday-Thurs. 8 a.m.- 4:30 p.m..

Art Unit: 2873

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on (571) 272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DaWayne A Pinkney/  
Examiner, Art Unit 2873  
05/14/2009

/Ricky L. Mack/  
Supervisory Patent Examiner, Art Unit 2873